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**Seventh Semester B.E. Degree Examination, December 2011**  
**Internal Combustion Engines**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. What is chemical equilibrium? How does it affect the performance of an engine? (06 Marks)
- b. With the help of a P-V diagram, explain how the variation in specific heats and dissociation of gases tend to deviate the ideal processes. (10 Marks)
- c. What are the combustion charts? Where these are used and why? (04 Marks)
  
- 2 a. Briefly explain the mixture requirements of an SI engine. (05 Marks)
- b. Explain the working of a simple carburetor with a sketch and give its limitations. (08 Marks)
- c. Briefly explain the effect of various engine operating variables on SI engine knocking. (07 Marks)
  
- 3 a. Explain briefly, with pressure-crank angle diagram, the stages of combustion in CI engines. (10 Marks)
- b. What are the different methods of controlling diesel knock? (06 Marks)
- c. What is knock rating of diesel fuel? (04 Marks)
  
- 4 a. What are the basic requirements of a good SI engine combustion chamber? (05 Marks)
- b. Explain with neat sketches, the F-head and I-head combustion chambers. Discuss their advantages and disadvantages. (10 Marks)
- c. Explain the role of swirl in diesel engines. (05 Marks)

**PART – B**

- 5 a. Give the general chemical formula, molecular arrangement and mention whether saturated or unsaturated, the following constituents of crude petroleum:  
i) Paraffin ii) Napthane iii) Olefin iv) Aromatic series. (12 Marks)
- b. Explain the reasons for looking for alternative fuels for IC engines. (04 Marks)
- c. What is bio-gas? How a dual fuel bio-gas operated diesel engine works? (04 Marks)
  
- 6 a. How are the injection systems classified? Describe them briefly. What are the limitations of an air injection system? (10 Marks)
- b. What is the necessity of cooling of IC engines? Explain any one method of cooling. (05 Marks)
- c. With a neat sketch, explain the Pintaux nozzle. Discuss its merits. (05 Marks)
  
- 7 Write short notes on the following : (20 Marks)
  - a. Turbo charging
  - b. Stratified charge engine
  - c. Multifuel engine
  - d. Supercharging
  
- 8 a. What are the main sources of pollutants from a gasoline engine? Explain. (06 Marks)
- b. What are the methods of controlling NO<sub>x</sub>? Explain. (08 Marks)
- c. Explain the thermal reactor package, with a sketch. (06 Marks)

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